EXHIBIT A

Analysis of Electric Broadband 6-Month Report, Experimental Authorization WB9XVP

Scope of the APS/Electric Broadband 6-Month Report

The 6-month report (the report) outlines the testing and interference evaluation that APS, Electric Broadband (EB), Mountain Telecommunications and Mitsubishi have undertaken with respect to the experimental broadband over power lines (BPL) facility located in Cottonwood, AZ. The report was submitted by EB, so they will be cited as the source in this analysis. Nevertheless, all four entities above apparently jointly operate this experimental BPL system.

The report continues EB's practice of denial of any interference issues associated with this system, despite continuing complaints and detailed and accurate technical showings submitted by the Cottonwood area licensees. In many cases, it appears that EB has made changes to the system, then reported only test results related to those changes, implying that any reports related to the original system configuration were inaccurate. The last round of field testing and evaluation was done by Cottonwood amateur licensees on September 9, 2004. This testing was documented on a video recording made of the work done by the Cottonwood amateurs in the field, showing clearly that BPL signals were present at various sites on frequencies where APS and EB claim it was not.

Omissions and Inclusions

The EB report contains somewhat more information than did the EB letter responding to interference complaints which was filed with the Commission on September 3, 2004. The 6-month report provides information about the detector mode and bandwidth used by the analyzer and indicates how the test equipment was powered. The graphical data in this report show that antenna factors were applied to this series of graphs.

However, there are still major omissions from the report. For example, in their response letter to the FCC about the interference complaints, EB and APS indicated that testing had been performed by a contracted consultant. Neither that letter nor this report provides any information about the consultant. The report is also not clear about who actually performed this testing. It would also be helpful to those that want to analyze this report if antenna factor data for the specific antenna used, and information about how it was applied to the screen graphs, had been provided.

Test Methodology Flawed

The test reporting is not done to industry or regulatory standards. The testing was not done using quasi-peak detection. Instead, a peak detector was used, and the video bandwidth of the measurement instrument was reduced to 1 kHz in some cases, 3 kHz in others, in an apparent attempt to simulate the 1 ms attack time of a "C63/CISPR" quasi-peak detector specification. If such a simplification were reasonable, the industry standards for EMC emissions testing would use it instead of the much more complex standard in the C63.4 or CISPR documents. C63.4 does permit the use of a peak detector, but only because a peak detector does provide at least the same level as a quasi-peak detector if the test instrument is used as described in C63.4. However, the test instrumentation was not used as described in the C63 standards, which explicitly state that the video bandwidth must be set larger than the resolution bandwidth if accuracy is to be maintained.

The use of a 1 kHz video bandwidth does not replace the use of a CISPR-weighted quasi-peak detector, which has a much longer "decay" time constant than the video bandwidth can apply. While such an approximation would be useful for a preliminary investigation, it does not represent an accurate measurement for verification and at this point, this system has still not been properly tested for compliance with the emissions limits. The method used is an approximation at best, and the smoothing that results from the inappropriate use of narrow video averaging probably underestimates the actual quasi-peak field strength by several dB. With the video bandwidth set at 1 kHz, smoothing will significantly reduce the level of the measurement.

Incorrect bandwidths were also used for part of this testing. A 9-kHz bandwidth is used for C63.4 testing on between 150 kHz and 30 MHz, but from 30 MHz to 1000 MHz, C63.4 requires the use of a quasi-peak detector in a 100-kHz measurement bandwidth. The use of a 9-kHz bandwidth will *significantly* under-measure the emission. The following paragraph explains the testing requirements in detail:

> ### 4.2 Detector function/selection of bandwidth
>
> Unless otherwise specified, radio-noise meters or spectrum analyzers shall have as the reference detector function the quasi-peak detector specified in ANSI C63.2-1996 or CISPR 16-1-1 (2003-11) for frequencies up to and including 1 GHz. For measurements above 1 GHz, if peak or average detectors are specified, use the requirements in ANSI C63.2-1996 or CISPR 16-1-1 (2003-11). Peak detector measured data may be substituted for the appropriate detector data to show compliance if the peak level obtained does not exceed the limit. The bandwidth used shall be equal to or greater than that specified in ANSI C63.2-1996. The bandwidth used shall be equal to or greater than 100 Hz from 9 kHz to 150 kHz, 9 kHz from 150 kHz to 30 MHz, 100 kHz from 30 MHz to 1000 MHz, and 1 MHz from 1 GHz to 40 GHz. However, the bandwidth used should be in accordance with the bandwidth specifications in ANSI C63.2-1996 or CISPR 16-1-1 (2003-11). More than one instrument may be needed to perform all of these functions. Use of bandwidths greater than those specified may produce higher readings for certain types of emissions and should be recorded in the test report. In case of dispute, the reference receiver shall take precedence.
>
> The measuring instrument shall satisfy the following conditions:
>
> — The measuring instrumentation with the quasi-peak, peak, or average detector shall have a linear response.
>
> — When measuring an emission with a low duty cycle, the dynamic range of the measuring instrument shall not be exceeded.
>
> When using a spectrum analyzer or other instrument providing a spectral display the video bandwidth shall be set to a value at least three times greater than the Intermediate Frequency (IF) bandwidth of the measuring instrument to avoid the introduction of amplitude smoothing.
>
> NOTE — For the purposes of this document the term *Intermediate Frequency (IF) Bandwidth* and *Resolution Bandwidth* are synonomous.

The tests also indicate that an active loop antenna was used, always oriented parallel to the power lines. Although this often will result in the point of maximum pickup, the interim FCC-recommended test procedures are clear that the loop is to be rotated and the point of maximum emissions determined. The present recommendation also requires that testing be done at specific multiple points along the power line. Nothing in this 6-month report indicates that such multiple-point testing was performed.

At this point, APS and EB have had 6 months to complete the necessary compliance testing, and, from all information of record, the testing done to date has been incomplete or inaccurate.

The 30-50 MHz Test Data Show That Part 15 Emissions Limits Are Exceeded in This System

In their 6-month report, EB claims that their tests indicate that this system complies with the FCC limits, but their own test data compel a different conclusion. Although not directly related to amateur interests, ARRL notes that the emissions limits on 30-50 MHz are being significantly exceeded. This is a band actively used in Arizona by public safety organizations.

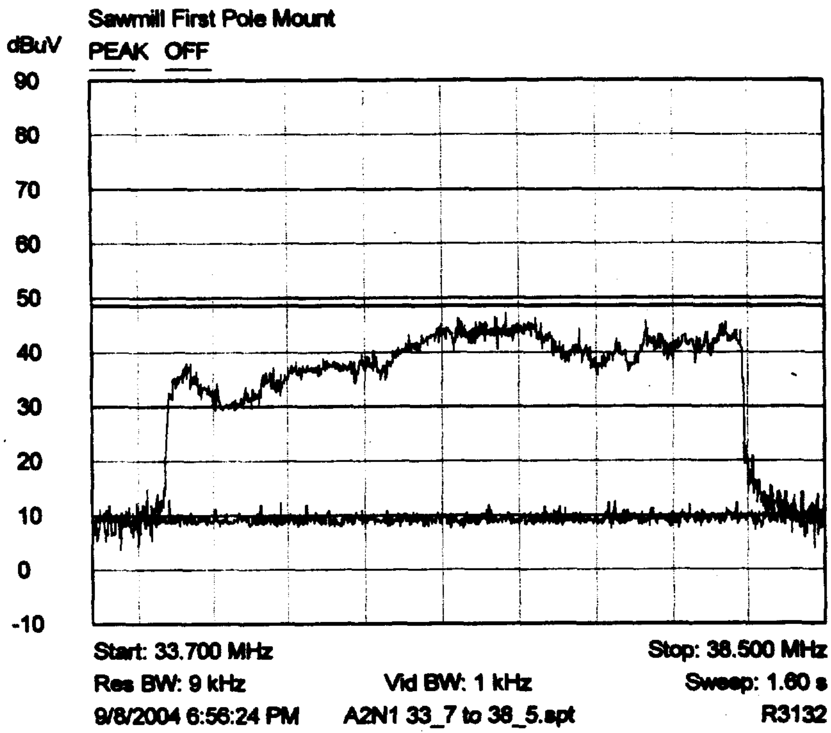

Figure 1: This figure from Page 20 of EB's report shows the measured levels between 33 and 38 MHz at the Sawmill test area, "first pole mount." These data were presumably taken at the same 10-meter horizontal distance that EB states was used for all of its testing. The emissions limits on this frequency are 100 uV/m at 3 meters distance. On this frequency range, Part 15 regulations call for a 20-dB/decade distance extrapolation. C63.4 also stipulates that a quasi-peak measurement in a 100 kHz bandwidth must be used on this frequency range. This test was done using a peak detector in a 9 kHz resolution bandwidth, using a 1 kHz video bandwidth, not extrapolated for distance. At 10 meters distance, the extrapolated emissions limit is 35.6 dBuV/m. It is impossible to accurately predict the effect of the incorrect resolution bandwidth and video bandwidth, but the worst-case estimate is that this will under measure the field strength by 10*log10 (100 kHz/1 kHz), or by a factor of 20 dB. Suffice it to say, the error is at least 10*log10 (100 kHz/9 kHz), or 10.45 dB. According to their own test data, this system exceeds the Part-15 emissions limits by approximately 19 to 28.5 dB on these frequencies. This correlates well with the strong signals in this frequency range as observed by the Cottonwood-area amateur licensees.

Inaccuracies and Inconsistencies

In addition to the fundamental flaws in the test methodology, the test results provided in EB's report show results that are not self-consistent. They do not accurately represent the ambient conditions at the test sites, and the inconsistencies show that the results cannot represent the emissions levels accurately.

An AH Systems SAS-562B 18-inch active loop antenna was used for this testing. Although the report does not include serial-number specific data, the following Table 1 shows the "typical" antenna-factor calibration from AH System's web page[1]:

Table 1

Frequency	Antenna Factor dB/m
2 MHz	33.4
5 MHz	23.4
10 MHz	14.8
15 MHz	1.8
18 MHz	-19.8[2]
20 MHz	9.3
25 MHz	12.3
30 MHz	15.3

The following figure shows the complete antenna factor data in graphical form.

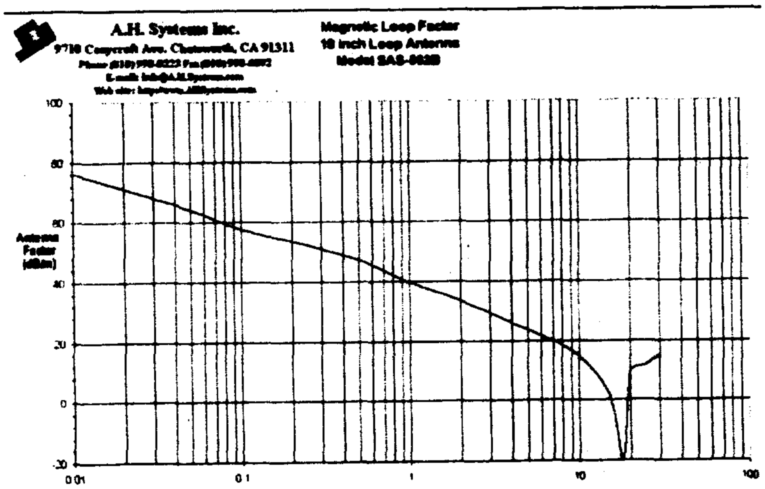

Figure 2: This is the typical antenna factor data for the AH Systems model SAS-562B calibrated loop antenna.

In many cases, the graphical data show major inconsistencies between the reported measurements with the BPL system "on" and the ambient signal and noise levels with the BPL system "off." In graph after graph, the data with the BPL system on shows a marked decrease in the strength of received ambient signal levels that were somehow stronger than the BPL signal with the BPL system off, then decreased by tens of dB with the BPL system off. In other cases, the ambient noise levels show a similar change, with the presence of the BPL signal causing an unexplainable decrease in the ambient noise level of the testing or environment across the entire spectrum being measured. These inconsistencies will be discussed in detail in the following text, with selected figures from the EB report included as examples.

[1] Data below 2 MHz were eliminated from this table

[2] This data point is not a typographical error. The antenna shows a strong resonance near 18 MHz that significantly increases its sensitivity on or near that frequency. This antenna factor is equivalent to an antenna gain of 15.1 dBi. This is typical of an amplified small loop near its resonant point.

Sensitivity and Noise Floor

The use of a spectrum analyzer and small loop antenna is sufficient in most cases to measure Part-15 level signals. It is *not* sufficient, however, to measure typical ambient noise levels on HF. The AH systems antenna has an antenna factor of approximately 28 dB on 3.5 MHz, according to their typical graph. This equates to an antenna gain of -46.9 dBi. A typical amateur antenna on this frequency would be a half-wave dipole up about 10 meters in height. EZNEC analysis of this antenna predicts that will have a gain over ground of approximately +6 dBi. So the antenna used for this testing has a gain that is about 53 dB lower than an antenna typically used by a radiocommunications station operating on the lower part of HF. Even a short mobile whip, typically only a few percent efficiency, has approximately 25-35 dB more gain than the small loop on 3.5 MHz.

The following graph shows measurements made in ARRL's screen room of the broadband noise response of ARRL's AH Systems SAS-563B amplified loop antenna. The broadband noise response is actually flat vs frequency, but this graph has been corrected for the specific antenna factors for SAS-563B serial number 326.

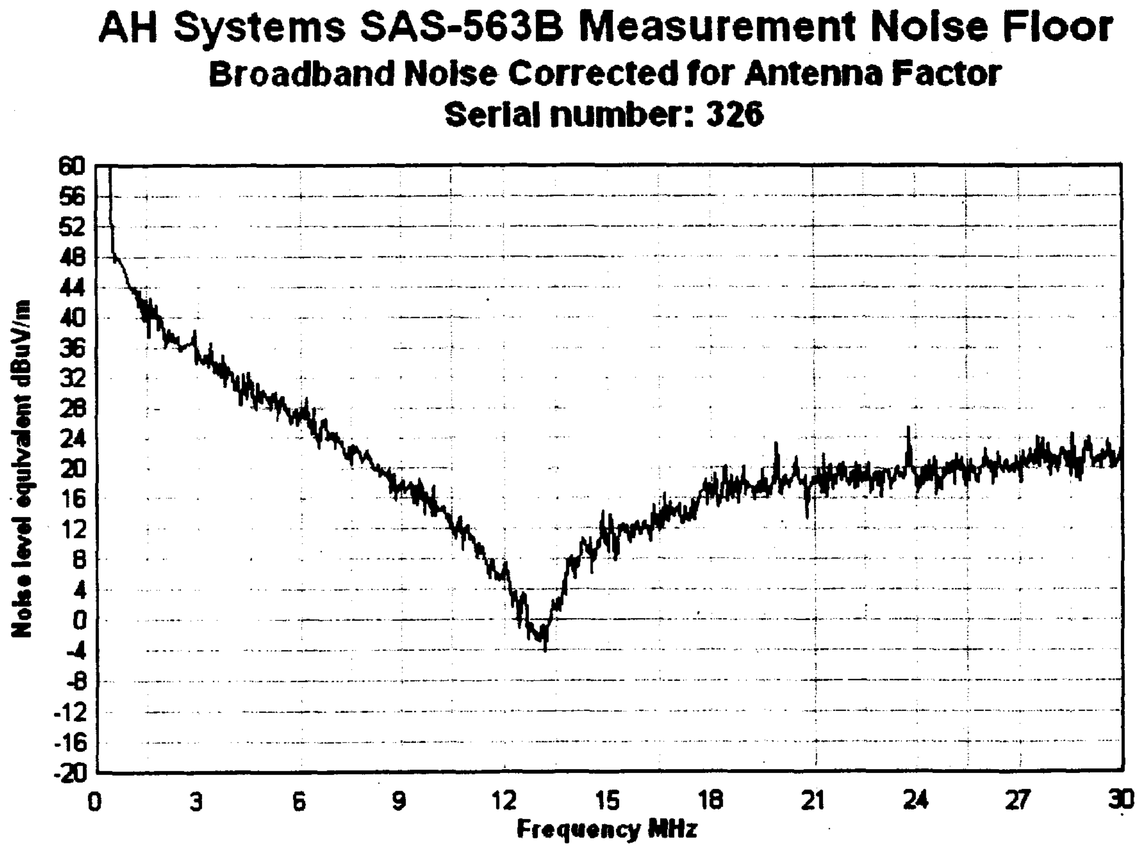

Figure 3: This figure shows the noise floor of the antenna and HP-8653B spectrum analyzer, corrected for antenna factor. This is the minimum sensitivity of the test equipment, and measurements cannot be made below this level. While ARRL's specific serial number is a bit different than the one used by EB, this test-fixture noise floor corresponds well to the levels reported by EB and APS as "ambient noise levels." Their results may be the ambient noise levels of their test fixture, but the relative noise levels made by amateurs using their receiver signal-strength meter readings show that the ambient noise level in the area is much lower than what was reported by EB and APS. A simple analysis of the specifications of the test instrumentation explains their results and incorrect conclusion.

The only spectrum on which the AH Systems SAS-562B antenna has gain approaching that of a typical station antenna is near 18 MHz. For that reason, only the graphs shown that cover the 18-MHz region of the spectrum are showing the ambient noise level conditions. Other graphs show a higher test-fixture noise floor and some of the stronger ambient over-the-air signals -- at a reduced signal level compared to that expected on a communications receiver connected to a typical antenna. For comparison, a measurement reported on 18 MHz is contrasted to the measurement reported on 3.5 MHz below. The 18-MHz graph shows ambient noise levels; the 3.5 MHz graph shows the antenna preamplifier's input noise level.

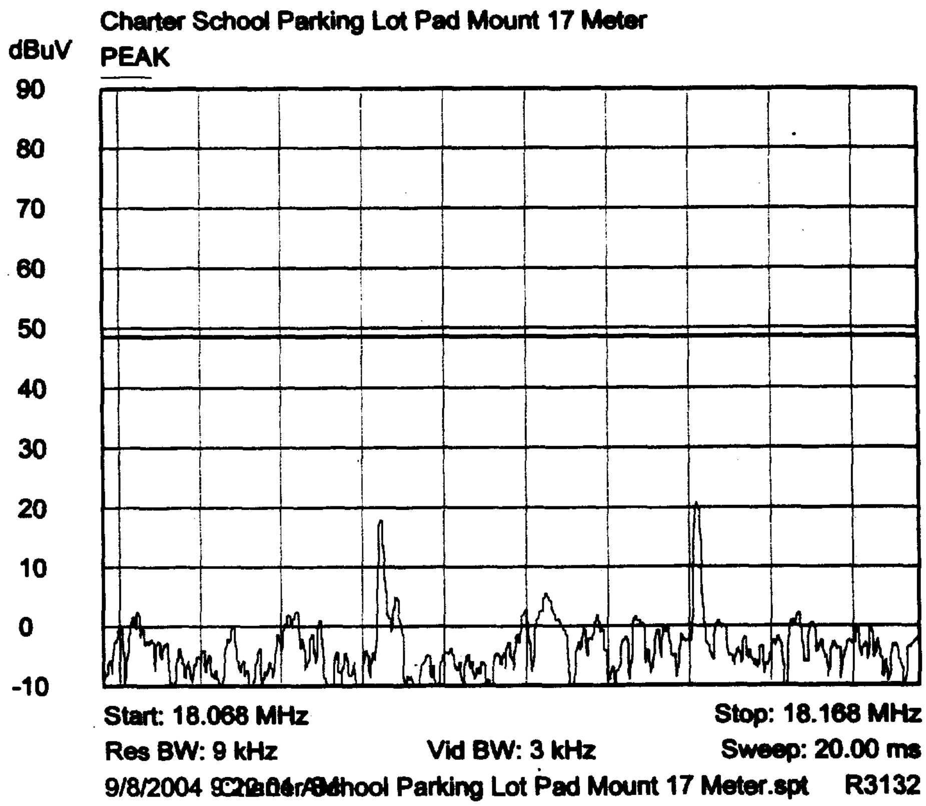

Figure 4: This shows the ambient noise level on the 17-meter amateur band. In stark contrast to EB's claim that the ambient noise levels were high at their test locations, these data show an ambient noise level below -10 dBuV/m. This corresponds well to the low noise levels measured by ARRL in its testing of ambient noise levels made in another part of the country. Of note, on 18 MHz, the antenna factor of the AH Systems SAS-562B is typically about -20 dB. This corresponds to a gain of 15.3 dBi.

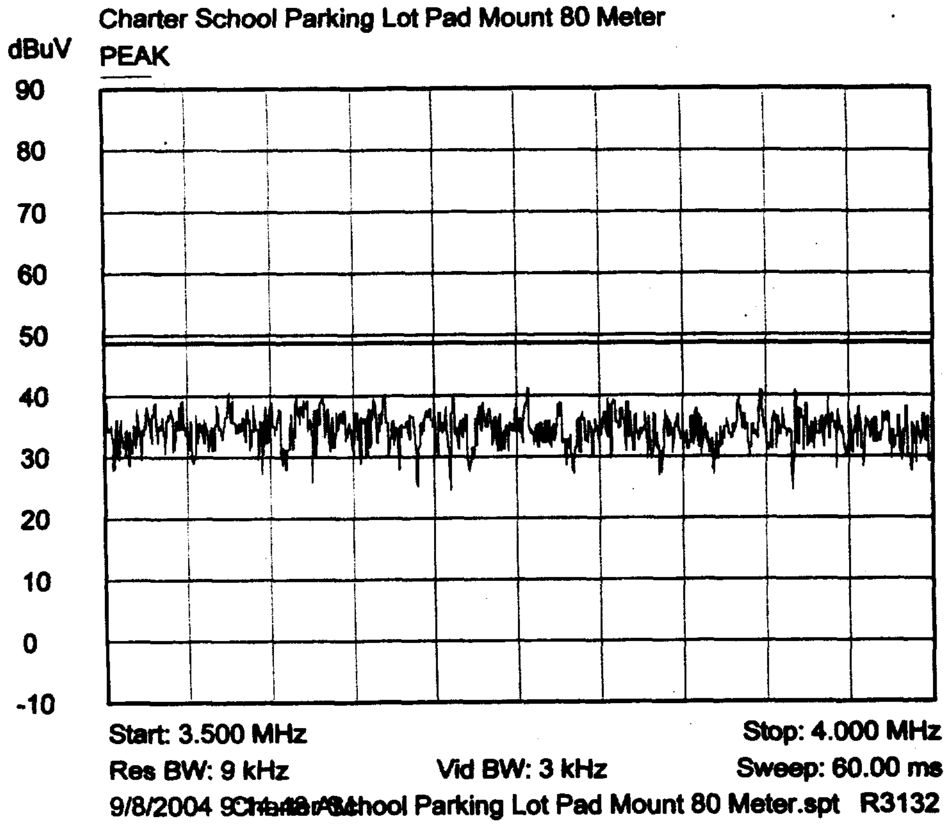

Figure 5: This shows the reported measurements on the 80-meter amateur band. The typical antenna factor of the SAS-562B is +28 dB on 3.5 MHz. This is 48 dB higher than the antenna factor on 18 MHz, and not surprisingly, most of this difference shows on the noise level seen on this graph. This graph shows the noise floor of the test fixture, not the much lower ambient noise level to be expected on 3.5 MHz in a typical residential environment.

Inconsistencies in BPL "on" vs BPL "off" Levels

In graph after graph, inconsistencies are seen between the data for the BPL signal on vs the BPL signal off. The only explanation is that the test conditions between the two measurements must have been different.

This is best illustrated by the following examples from EB's report:

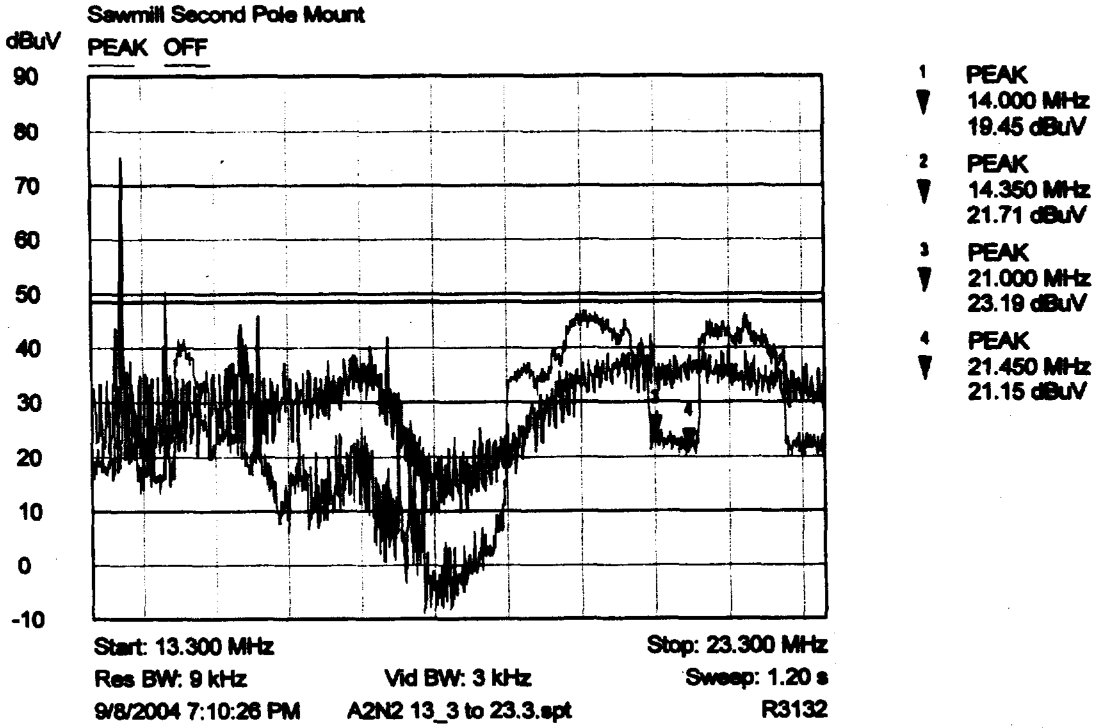

Figure 6: This graph purports to show the measured levels with the BPL system on and then off between 13 and 23 MHz. Green shows the BPL system and red shows the BPL system off. If these data are accurate, one would have to conclude that turning the BPL system reduced the ambient noise and signal levels by 20 dB across part of the frequency range being measured. Most dramatic is the notch that is shown between 21 and 21.45 MHz. The ambient conditions on this spectrum are shown to be 35 dBuV/m, yet when the system is turned on, these data show that a measurement can somehow be made 15 dB below this level. If the measurement of ambient levels is correct and the bandwidth between the two measurements is the same, the only way this ambient-level-vs measurement-level can be reconciled would be to increase the level of the BPL-measurement line (green) until the ambient noise levels in the notched spectrum match. If this were done, however, the BPL signal would increase a corresponding amount, and would thus exceed the Part-15 emissions limits by a considerable margin. The notching in the ambient and BPL-signal data is a representation of the antenna factor data programmed into the analysis software used to capture and display the spectrum-analyzer information.

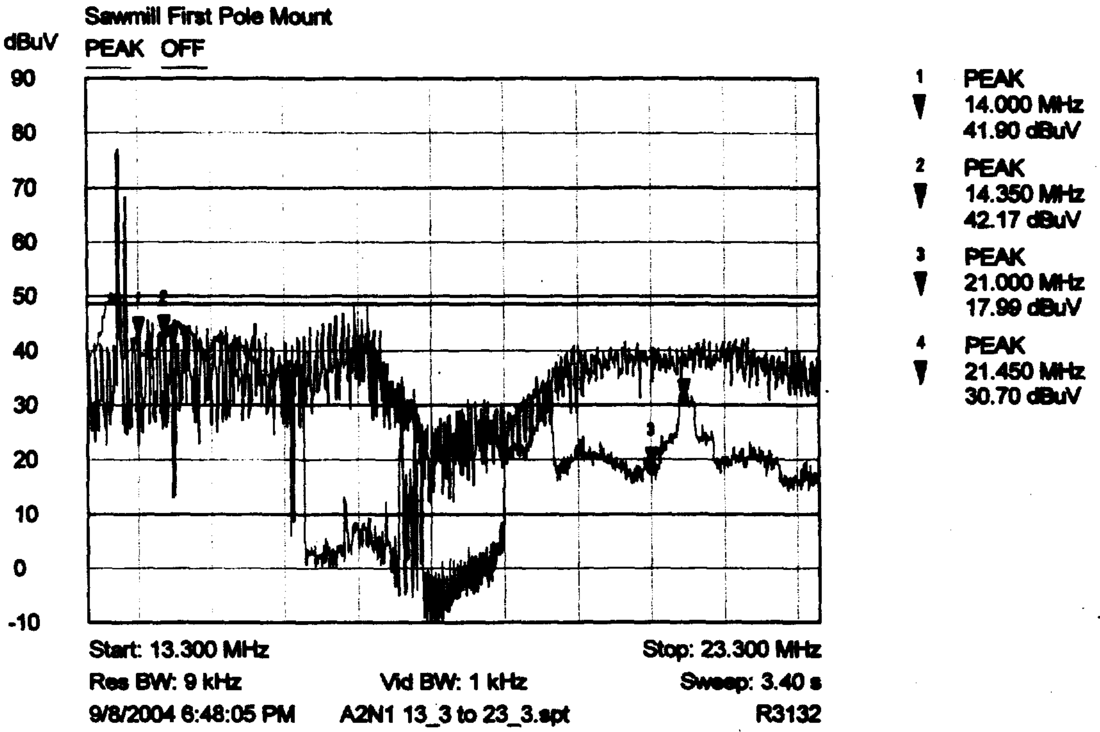

Figure 7: This graph shows the same problem, at a different test location. In this case, the apparent decrease in ambient signal and noise levels is about 30 dB in part of the spectrum. If these data were presumed to be correct, turning the BPL system on would be having the impossible effect of dropping the noise level in the spectrum it uses by 30 dB. This graph also shows that Based on the difference in the amount of noise shown on each line, it is possible that the bandwidth was smaller for the "BPL on" measurement or different analyzer reference level settings were used for each of the data lines shown in this graph. It is not possible that turning on a BPL signal would decrease the ambient noise levels by 30 dB. If the BPL data were increased by 30 dB to match up the ambient noise levels, the BPL signal would exceed the FCC Part-15 emissions limits.

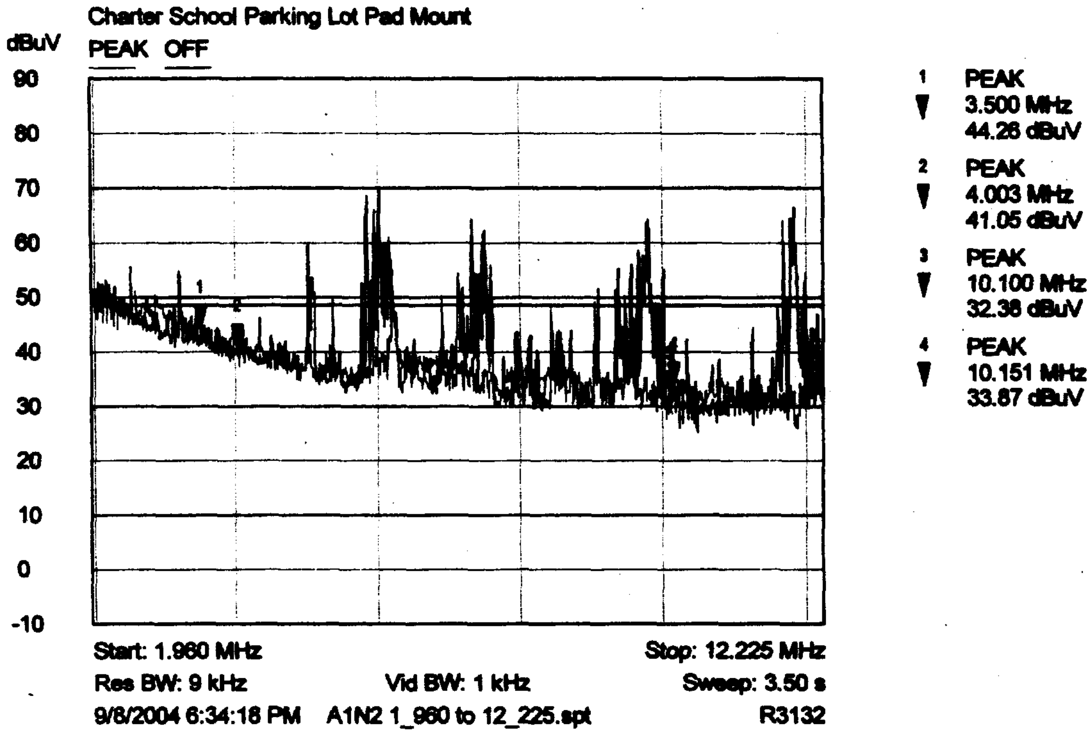

Figure 8: In this graph, on spectrum that the BPL system does not appear to be using at this location, the ambient noise levels match up. However, the graph with the BPL system "on" does not show most of the much stronger ambient over-the-air signals seen on the graph of the BPL system off. If these data were taken at the times indicated with the same test conditions, the stronger ambient signals levels would have been approximately the same in both graphs. The presence of the BPL signal would not have reduced the level of all of the ambient signals propagating to the area at that time. Incidentally, Most of the ambient noise in this frequency range shows the lower limit of the test fixture, not the level of the local ambient noise levels in between the on-the-air signals.

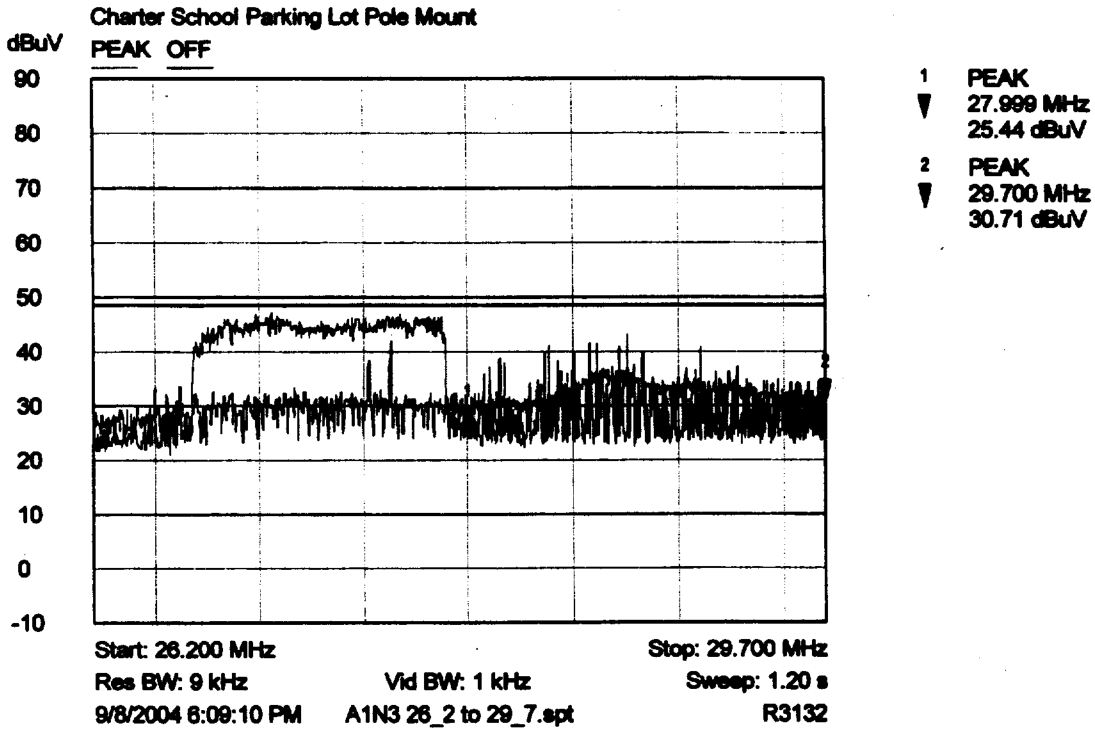

Figure 9: The EB report indicates that no BPL signals were present in any amateur band. This graph, however, shows the BPL system on with the green line and the BPL system off with the red line. It is clear that there are strong signals present -- above 40 dBuV/m in some case -- in the amateur band when the BPL system is operating. At 40 dBuV/m, these would be typically reported by licensees as "S9" level signals, very strong compared to the weaker licensed signals that are typical on this spectrum. If the ambient noise levels were set the same on both data sets shown in this graph, the BPL "on " signal would increase by a corresponding amount. As shown in an earlier section of this document, their reported "ambient" levels really show the noise floor of their test fixture. The BPL signals in the 28-29.7 MHz amateur band are well above the ambient noise level seen in that spectrum.

Examples

The graphs shown above are examples from EB's report. Taken as a whole, most of the graphs show a decrease in the ambient noise and signal levels for the BPL "on" data. In all cases where this occurs, the BPL signal is shown to be just below the FCC limits, with the decrease in BPL-on ambient noise levels just sufficient to show the BPL-on signal just below the limits. The amount of difference varies from graph to graph, yet the end result in each case is that the BPL signals are always shown below the limits. In those graphs where there is no appreciable difference in ambient levels, the BPL signal is seen to be well below the FCC limits.

DOCKET NO. 04-37, 03-104 Attachment A

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